EXTERNAL BOARDS BUSINESS OPERATIONS - NEW PRODUCTS ENGINEERING

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ABSTRACT: This section of the EBB Operations Manual describes the activities and procedures of the New Products Engineering (NPE) group.

APPLICABILITY: Intended as a guide for use by EBB New Products Engineering personnel and as a reference document for EBB and other interested Digital personnel.

STATUS: APPROVED 20-Feb-1989; see EL-INDEX-00 for expiration date.

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1 INTRODUCTION

EBB New Products Engineering (NPE) is responsible for ensuring that the U.S. and GIA printed-wiring board (PWB) vendor base is positioned to supply the technology needed to support Digital new products prototype pre-release and volume procurement activity.

1.1 GOALS

NPE goals are to:

Introduce technologies to the supply base early enough to accommodate vendor feedback.
Recommend design optimizations for highest board yields.
Have at least two suppliers (one independent) capable of each technology at release (Phase 4).
Assist the supply base to improve yield, quality and cycle time.
Transition new products to volume manufacturing with all issues visible and resolutions initiated.
Participate in qualification and engineering teams/forums for new products.

1.2 ORGANIZATION

NPE reports into the EBB New Products Business Manager, who in turn reports into GIA Group Materials. NPE consists of the New Products Engineering Manager, three New Products Engineers and one Process Technology Engineer.

See organization chart (Figure 1).

1.3 APPLICABLE FORMS

a. EBB Engineering New Product Flagging Form (Figure 2)

b. EBB New Products Engineering Feedback Report (Figure 3)

2 NEW PRODUCTS REVIEW

The three New Products Engineers are assigned different technologies, based on layer count: 2-8 layers, 9-10 layers, and 11 layers and above. Their responsibilities include:

2.1 DOCUMENT REVIEW

Review pre-design questionnaires (PDQs), looking for nonstandard features. Highlight areas of concern and file for future merging with print file. Feedback to Site Producibility may occur at this point.

After notification from EBB Tool Generation of a new part being sourced through purchasing, receive print package and complete the FLAGGING FORM and pull the PDQ from your files. The FLAGGING FORM will indicate to purchasing what vendor(s) is recommended. It will also flag what nonstandard features to notify the supplier(s) on.

Distribute the FLAGGING FORM to purchasing and volume engineering and place a copy in the print package. Return the print package to the "QTA" files in the Tool Generation Library.

2.2 FEEDBACK TO SUPPLIER AND DESIGN SITE PRODUCIBILITY

Phone or meet with supplier(s) that will build the board. Review all documentation, paying particular attention to nonstandard features.

Receive feedback from supplier during and after build. Contact the Pre-Design Producibility and Design Engineer, to suggest changes to specs or design that make the product more manufacturable, thus reducing costs and improving quality levels. Use the EBB NEW PRODUCT ENGINEERING FEEDBACK REPORT (Figure 3).

Respond to the supplier(s) in writing on the action Digital has taken on their feedback.

2.3 QUALITY IMPROVEMENT

- Drive new product quality up through supplier interface.
- Resolve build problems with supplier.
- Understand design and assembly issues.
- Participate on New Products MRB team.
- Recommend new tools and equipment to EBB QC and supplier.
- Prepare and send new products checklists to EBB QC for a product family.
- Train EBB QC on documentation and inspection/test procedures for new products.
- Identify new test requirements to the EBB Test Engineer.
- Participate in supplier management teams.
- Participate in supplier audits.
- Review and input to sections of DEC STD 176 and DEC STD 030.

3 PWB PROCESS TECHNOLOGY PLANNING

The responsibilities of the NPE Manager are:

- To understand the technology position of the active EBB supply base.
- To apply for and obtain E97 process development funding to assist the suppliers in developing newer PWB technologies.
- To supply a monthly status report of E97 spending to EBB Finance.
- To represent EBB in PWB technology forums.

The responsibilities of the PWB Process Technology Engineer are:

- To establish key processes with strategically important suppliers using E97 funding. E97 funding activities will include:
  - **a.** Market survey for best process
  - **b.** Definition of best process, including sizing of equipment
  - **c.** Definition of process variables
  - **d.** Process setup, screening, and optimizing experimentation of process using test vehicles (TVs)
  - **e.** Documenting "best process" capability and product characteristics

f. Obtaining necessary UL approvals

- Keep abreast of new materials and processes that will be used in new technology PWBs 1 to 3 years out. Develop test vehicle (TV)/development plans to support this. Meet periodically with GSO and AIS on new technologies.
- Work with suppliers to obtain the necessary UL approvals required for new materials and processes; maintain a status list for these approvals.
- Publish reports on TV results and meet with suppliers to review areas for improvement. Position supply base to support new technologies.
- Get feedback from suppliers on test vehicles; feedback supplier comments to appropriate EBB new products engineer and appropriate design/producibility groups.
- Be the focal point for AIS and GSO engineers for interface/development work with the EBB supply base.
- Facilitate designer/supplier technology forums to be held two times per year.
- Input to sections of DEC STD 030 and DEC STD 176 regarding new technology.

4 PHASE REVIEW

EBB New Products Engineering is involved with Digital's new products Phase Review. These activities are shown below.

Pre-Phase 0

- NPE Manager meets with GSO Time-to-Market Technology Manager to evaluate upcoming technologies and assess impact to EBB supply base; identify E97 process development needed.
- Contact design groups and producibility; recommend design alternatives to improve product costs.

Phase 0 - Strategy and Requirements

- Generate the technology impact statement from input from the EBB targeted suppliers.

Phase 1 - Planning

- Input the EBB section into the PWB Manufacturing Plan: test vehicles, UL requirements, and qualification.
- Give technical input to purchasing for supplier sourcing strategy.

Phase 2 - Implementation

- Interface with EBB targeted suppliers to complete any test vehicles needed for process optimization through experimentation.
- Complete outstanding UL issues, if any.

Phase 3 - Qualification

- Assist quality engineering to interface with suppliers on results of qualification. Give technical assistance to supplier to obtain permanent corrective actions to assure qualification standards are met.

Phase 4 - Volume Production

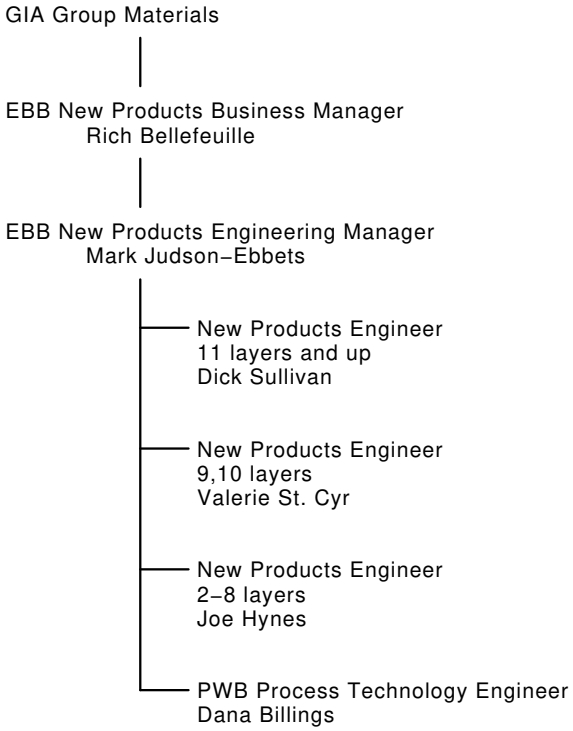
- Transition New Products Engineering documentation to the Volume Engineering group, with all issues visible and resolutions initiated.

5 SECURITY OF CONFIDENTIAL INFORMATION

New products engineering documents are treated with the following security measures:

- Documents marked "Digital Confidential" or "Digital Restricted Distribution" are not left unattended on top of desks; they are locked up at the end of working hours.
- Documents marked "Digital Internal Use Only" may be left on top of desks, but are not distributed to non-Digital employees.
- Video terminals are locked (or logged off) when left for extended periods.

Figure 1: EBB New Products Engineering Organization



6 EBB ENGINEERING NEW PRODUCT FLAGGING FORM

Figure 2: Flagging Form

Date_____

Completed by_____

Board number _____ Rev. _____ No. Layers _____

Nonstandard features:			Enter feature, if yes:
Panel size GT 18 x 24?	No	Yes	_____
Aspect ratio GT 5?	No	Yes	_____
Smallest hole LT 0.020?	No	Yes	_____
Thickness GT 0.093?	No	Yes	_____
Line width/spacing LT 6/10?	No	Yes	_____
Buried vias?	No	Yes	_____
Blind vias?	No	Yes	_____
SMT pitch 25 mil or less?	No	Yes	_____
Thick copper? (GT 3 oz.)	No	Yes	_____
Material other than FR-4 used? (Poly/BT/etc.)	No	Yes	_____
Ohmega used?	No	Yes	_____
Any confusing/conflicting specifications?	No	Yes	_____

Special other considerations: (consider SMOBC, Dry film, Test, tight tolerances, CC, CI, SMT, impedance layup must be reference only)

Customer _____ Contact: _____

PDP Engineer _____

Program _____

Recommended supplier(s) _____

Supplier used _____ Supplier contacted on (date) _____

cc: New Products Purchasing, Volume Engineering

7 EBB NEW PRODUCTS ENGINEERING FEEDBACK REPORT

Figure 3: EBB New Products Engineering Feedback Report

digital™ INTEROFFICE MEMORANDUM

TO: Producibility Engineer:

DATE:
FROM:
DEPT: EBB N/P ENG.
EXT:
LOC: CHM1-1/E1
ENET: BOARDS

PART NO.:

REVISION:

SUBJECT: PROBLEM FOUND AT (Vendor name, EBB or Customer)

The following items were identified as potential manufacturing problems with this board. ALL items must be resolved before it can be released to manufacturing.

[Instructions to EBB New Product Engineer: List below all enhancements and suggested changes to specifications to make them clear, and design changes to improve manufacturability and reduce costs.]

** Attention PDP engineer: PLEASE RESPOND! **

1.

2.

APPENDIX A

REFERENCED DOCUMENTS

EL-Class Number	Document Title
EL-00030-00	*DEC STD 030-0 Module Manufacturing Standard*
EL-00176-00	*DEC STD 176-0 Printed-Wiring Board Acceptance Criteria*

Copies of Digital EL-Class documents may be obtained from Standards and Methods Control, NRO4/D4, DTN: 287-3724, JOKUR::SMC.

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